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Editorial.

THE MELBOURNE UNIVERSITY APPLICATION.

THE request made to our Council by Professor Harold Woodruff, Dean of the Faculty of Veterinary Science of Melbourne University, that the B.V.Sc. graduates of this University shall be admitted to our "Register" as Colonial Practitioners is one that will no doubt receive due and serious consideration by our governing body. It is a sign of the times that the request is made, and provided that the University authorities can show that their teaching and examining is equal to that prevailing in this country we see no reason why they should not be granted what they ask.

We notice in our "Register" that a blank space for Colonial and Foreign Veterinary Surgeons has existed for some time. The pages are distinguished by their pristine whiteness as if they were analogous to "the white flower of a blameless life." They form a useful gap for making notes in, but do not indicate any violent progress or productive husbandry. Perhaps the day will come when "the desert will blossom as the rose."

In Colonial regions we can imagine that some graduates from extraneous institutions may be more practical and valuable than our home examples. At any rate, a man going from this country will for a time be quite at sea in attending to a kangaroo, buffalo, camel, elephant, gazelle or ostrich, and yet the nature of his early teaching may be sounder and more substantial than that of the colonial collegian. It is rather an anomaly that a British graduate going to act as a veterinary surgeon in America has to sit before an American board before he is given a licence to practice,

but self-preservation is the first law of nature, and no doubt the Americans believe our standard of knowledge is not so high as theirs. If we carry this analogy to our own colonies and possessions it tends to make us put on our considering caps.

We have always assumed human nature being what it is, that examinations for diplomas conducted by teachers of the examinees can never be as valuable as those carried out by efficient external examiners. We know that much has been said and written to the contrary, but it has never convinced us. The difficulty, however, in a comparatively young, undeveloped, and growing colony or continent is that the supply of old crusted examiners is for a long time never likely to be equal to the demand, if external examiners are to be essential. The trouble, however, is not one that it is impossible to get over. Reliable and competent representatives from the mother country may be appointed to hold watching briefs over the examinations, and the representatives asking for the innovation can concentrate on the thoroughness, broadness, and high standard of their teaching.

For the rest we can see nothing but good in the granting of the request of the Melbourne University. The more of the right type of members on our Register to act in places not overcrowded with our fraternity the better and more thorough the advance of our profession will be. The bigger the number of united men the more likely are they to come into their own, and the easier the difficulties that meet them are likely to be overcome. We can even see a valuable advantage in having colonial representatives on our Council.

The ground to be hoed is big, the work to be done is vast, the more the workers can plan and reason together the better for them individually, the greater the uplift, and the finer and more valuable the character of the work. The hour has struck for all sections of British activity to work together for the common good, and it will be our own fault if our body is left behind in the advance. We are intellectual enough to win through, lead, and set an example, and we desire neither to be lacking in foresight nor far sight.

THE COPY AND THE ACTUAL.

THE copy may be so like the actual as to defy detection. The thought and effort in making the former may lead to the acquisition of ability for easily overcoming the difficulties attending the production of the latter. The carrying out of a perfect imitation may effect the grasping of the main principles in the creation of the reality. We often wonder whether the use of models and artificial conditions are taken the fullest advantage of when teaching deftness and adaptability in the art of surgery and obstetrics. Most men know that the knots in surgical sutures are not well placed if they are tied directly over the wound itself, and the importance of fixing the point of an angular wound before dealing with its edges is also evident, but we do not remember this being impressed on us as pupils, and yet we had worthy and experienced tutors.

Again the operation for the extraction of a horse's molar tooth may very well be learnt in its first principles on a dead subject. The value of getting the mouth wide open, a good light into the buccal cavity, the proper fixing of the forceps on the right tooth to be drawn, the insertion of the fulcrum in the best place, the correct position of the operator and movement of the extractor to loosen and draw the tooth are all lessons learnable in college days. Yet too often knowledge of these things is acquired afterwards. The operation for removal of the lateral cartilages is one that even experienced practitioners are hazy about. Its copy on one dead subject may be done eight times. Smith's operation for side bone, too, ought to occasion no difficulty as regards its technique to the embryo M.R.C.V.S. if he has taken every opportunity to learn his art and science early. Spraying and Cæsarean section can be done a time or two on the dead subject and the material in a College clinique or a decent practice comes to hand now and then.

Perhaps our profession is lacking most in respect to obstetric models. It is true that opportunities for a few calving and foaling cases occur to most pupils, but there are an almost infinite variety of fœtal positions that will tax all the skill and ingenuity of the practitioner to overcome. Nearly all of these can be illustrated on a reliable imitation of a pregnant animal.

XUM

We have heard of a graduate spending an hour or so in trying to get a rope round the foot of a calf in a breech presentation by carrying the noosed rope into the uterus of a cow and attempting to put the noose over the limb from its pedal end. It never struck him that if he had carried the line round the hock between the hind legs, noosed it outside, and drawn it loosely round the hind leg that he could have slipped it down on to the fetlock or over it, drawn the cord tight, and thus raised the hind leg after pushing the calf forward. Had he practised well on a model the difficulty would probably never have arisen.

To the thoughtful man there are many other things likely to occur in practice, that constitute its profitable side, in which a graduate may well be grounded by paying early attention to imitations before dealing with realities.

Students will doubtless require to request, point out, or agitate before all they require is granted, but to turn out good men is payment of a debt of honour, and an aim worth striving for. A good knowledge of the copy aids materially in dealing with the actual.

SOME NOTES ON THE LIFE OF WILLIAM PERCIVALL.

William Percivall, along with Blaine and Youatt, was one of the earliest giants of the veterinary profession, who did much to raise it from an obscure position to one of some standing. His only surviving son, Percival Percivall, an ex West India Regiment officer, now living at Ipswich, aged 72, says that he was born in Kent in 1793, and was the son of John Percivall, Army Veterinary Surgeon. He was a pupil of Professor Sewell, and probably obtained the diploma of the R.V.C. in 1811. He served in the Peninsular campaign and received a medal and two clasps as veterinary surgeon to the old artillery drivers. The artillery drivers as such were disbanded after the battle of Waterloo, and the Royal Horse Artillery formed. In 1820 Percivall was appointed Veterinary Surgeon to the Life Guards, and was alternately stationed at Regent's Park Barracks, Knightsbridge, and Windsor. He had five sons and one daughter. One son, Thomas, entered

the Army as a veterinary surgeon, and was attached to the 11th Hussars for twenty years, but did not continue his father's literary work. Percivall was a keen observer and a faithful recorder. He was a great authority on "Lameness," and many of his remarks on this disability are as true to-day as when they were written. He was on friendly terms with Gamgee, William Field, Senr. and Junr., and Dr. Fleming. He died, working up to the last, at his house at Richmond, in 1854, and was interred in the family vault at Brompton Cemetery. The cause of his death was Bright's disease. His works include "Lectures on the Veterinary Art," published in 1823-1824, a copy of which he gave to the Emperor Alexander of Russia in 1824, and was presented in return with a gold snuff box. His "Hippopathology," in four volumes, was published in 1834; "Anatomy of the Horse" in 1832; and "Form and Action of Horses" in 1850; and in 1853 "Diseases of the Chest and Air Passages of the Horse." In January, 1828, he brought out the first number of "The Veterinarian," and was sole editor, but soon became associated in its production with W. Youatt. After Youatt's death he again took up the reins himself.

He studied at St. Thomas's Hospital, and in 1819 passed the examination for M.R.C.S., and subsequently became a Licentiate of the Apothecaries' Company.

Not much is known of his public professional life except that, as with all prominent men, he was the subject of much jealousy. He only appeared once as a lecturer, delivering a discourse on "Veterinary Science," at the University of London, on November 20, 1833.

[Mr. Percival Percivall, a son of the subject of this biography, Mr. H. L. Roberts, F.R.C.V.S., of Ipswich, and Mr. E. W. Hoare, F.R.C.V.S., of Cork, have given assistance in the compilation of these notes, which we hope will be interesting to the profession.—G.M.]

XUM

Selected Article.

LOCAL ANÆSTHESIA*

By PROF. G. H. WOOLDRIDGE, F.R.C.V.S.,

Royal Veterinary College, London.

ANÆSTHESIA, in the broad sense of the term, is "suspension of sensation," whether due to disease or injury or brought about by various agents called anæsthetics for surgical purposes. It is this so-called "surgical anæsthesia" that is to be dealt with in the course of this paper.

The chief objects of anæsthetics in surgery is the abolition of pain during operations, the prevention of various reflex movements, and the production of muscular relaxation. They are thus very valuable agents from the humanitarian aspect, and also from the surgeon's point of view by facilitating diagnosis and treatment.

Anæsthetics may be either *local* or *general*, the former acting only on the part to which they are applied, and the latter acting on the central nervous system and causing complete loss of sensibility. The production of local anæsthesia is thus indicated for surgical operations on limited areas, and also when it is considered dangerous to produce general anæsthesia on account of some defective condition of the patient. General anæsthesia is indicated, or called for, in the more serious or major operations involving larger areas or body cavities, in bad cases of dystokia, to relax muscles in the reduction of herniæ and luxations, and for setting of fractures; and also, in the case of the dog particularly, to cause relaxation of the abdominal muscles to facilitate the examination of the abdominal contents for diagnostic purposes.

The general advantages of anæsthetics both to the patient and the operator are now so well recognised, that in the British Isles, at any rate, their use is becoming more general, and I trust that the day is not far distant when no operation involving pain will be performed without the assistance of some anæsthetic or analgesic, if such can possibly be applied.

LOCAL ANÆSTHESIA.

Local anæsthesia can be brought about by various means. The old methods consisted of compression of nerve trunks and the

*Read at the meeting of the Central Veterinary Society on July 6th.

application of cold. The former was brought about by the use of the tourniquet, an agent now rarely used for that purpose, although still of great service in the practice of hæmostasis during operations on the limbs. The application of cold was accomplished by a mixture of equal parts of pounded ice and common salt in a muslin bag, and kept on the part for five or ten minutes until it was practically frozen. This method was superseded by the use of a spray of anhydrous ether or of ethyl chloride to freeze the part by rapid evaporation. These methods are not advocated now, as both the freezing and thawing processes are more or less painful, and if the part is too well frozen the healing process may be considerably retarded.

The local anæsthetics now employed are various chemical agents which produce paralysis of the peripheral endings of the sensitive nerves. They include cocaine, eucaine, holocaine, novocain, stovaine, acoine, tropacocaine, and hydrochloride of urea and quinine, and they may be used singly or in combination, either by painting on to the surface—which I call topical anæsthesia—or by injecting in or round the part to be anæsthetised—infiltration anæsthesia—or by injecting over the trunk of the nerve supplying the part—conduction anæsthesia. Excellent advantage can be taken of this latter method of anæsthetising the foot of the horse both for operations within the hoof, where for obvious reasons the local anæsthetic cannot be directly injected into the tissues, and also for assisting in the diagnosis of the seat of obscure lameness by the process of exclusion. In such cases the anæsthetic may be injected over the plantar nerves above the fetlock joint.

Cocaine, an alkaloid obtained from the leaves of the *Erythroxylum coca*, was the first chemical agent used in the production of effective local anæsthesia. (It was used for its effect on the eye about thirty years ago.) I will consequently consider cocaine first, and treat it later as a standard of comparison for various substitutes that have been introduced since Schleich demonstrated its wonderful utility when infiltrated into the tissues.

The pure alkaloid cocaine is only very sparingly soluble in water, but its salt, the hydrochloride of cocaine, is freely soluble in water and alcohol, and, being equally efficacious, is employed. When a 5 per cent. solution of cocaine (HCl) is applied to a mucous membrane or injected into the cutaneous or subcutaneous tissues, the first noticeable effect is pallor due to vascular contraction occurring in about

XUM

45 secs. to one minute; two or three minutes later the part has become insensible to pain and touch owing to paralysis of the sensory nerves of the part. This is due to a direct affinity on the part of cocaine for the cell protoplasm, especially of the sensory nerve-endings. This affinity for protoplasm should be well remembered when deciding upon the strength of the solution to be employed. I have frequently observed that when more concentrated solutions than 5 per cent. are infiltrated into operation areas, the healing of the operation wound is very materially retarded. The affinity of the cocaine in those strong solutions is such that it actually becomes a cell poison, and either markedly reduces the vitality of the cells or even destroys it, and healing by "first intention" is rendered impossible. I therefore, in the light of further experience, prefer to employ for infiltration anæsthesia larger quantities of weaker solution, injected at a series of points round the operation area, rather than a smaller amount of a stronger solution injected directly into the site of operation, a view contrary to one which I expressed several years ago when writing on the same subject. For injection into the tissues 1 per cent. to 4 per cent. solutions are to be preferred to the stronger solutions, though the latter, from 5 per cent. to 10 per cent., may be employed over a nerve trunk to produce conduction anæsthesia of a part below. In such cases the cells of the part directly exposed to the cocaine are not further mutilated by the operation incision, and the ill-effects are not so likely to occur; moreover, the anæsthetisation of the remote parts is more likely to be complete. When injected under the skin the area anæsthetised extends about an inch round the point of the needle. The insensibility occurs in from three to five minutes, and lasts from twenty to thirty minutes.

The amount of cocaine that can be injected with safety and without causing muscular spasms likely to interfere with operation varies with idiosyncrasy of the patient. In the small or so-called toy dogs 1-10th of a grain (*i.e.*, 10 minims of 1 per cent. solution) for each pound body-weight is usually quite safe. In larger dogs the same proportion may be employed, but in any given case 2 gr. (40 minims of 5 per cent. solution of 100 minims 2 per cent. solution) must be regarded as the maximum amount. In the cat the same proportion may be employed, but ¼ of a grain must be regarded as the maximum safe dose.

In the horse the maximum dose is 10 gr., an amount which is rarely required. Some horses are more susceptible than others, and I have seen great excitant toxic effects follow the hypodermic injection of 2 dr. of a 5 per cent. solution containing about 6 gr. of cocaine. Two grains in 40 minims of water injected over each plantar nerve will completely anæsthetise a horse's foot. I have no experience in the use of cocaine in cattle, except for the eye in cases of chaff under the eyelids, in which case it is very effective, allowing the foreign body to be removed quite painlessly, and in the operation for carcinoma of the orbit, when it is equally effective.

The local anæsthetic action of cocaine is much improved by combining with it a solution of suprarenal extract of adrenalin, or its synthetic substitutes, suprarenin, adnephrin and renastyptin. These agents cause a contraction of the vessels at and around the seat of injection, rendering the part anæmic and reducing the local circulation. Consequently the absorption of the cocaine into the general system is retarded, and the local anæsthetic action is rendered more complete and more prolonged. Less cocaine is necessary, and the danger of poisoning is thus reduced in both ways. The operation is further facilitated by being almost bloodless. The amount employed is from 5 to 10 minims of 1 : 1,000 solution for dogs, and up to 1 dr. of a similar solution for horses.

When small doses of cocaine are absorbed into the general circulation the effect is to act as a restorative and general stimulant of the central nervous system, and is consequently a very useful agent for producing local anæsthesia and minimising surgical shock in weak animals, especially dogs, when general anæsthesia is regarded as dangerous.

Toxic Effects.— When too large doses of cocaine are injected toxic symptoms are set up. A few minutes after the injection in such cases the patient begins to lick his lips and salivate, the eyes become dilated, and visual accommodation is interfered with, excitement and general hyperæsthesia are produced, the ears are moved rapidly backwards and forwards, and there are well-marked muscular twitchings or clonic spasms, and interference with co-ordination of movement, while horses paw the ground and are often difficult to control. This state of affairs, and particularly the muscular spasms, obviously defeat the object of the administration of the cocaine, and it is impossible to proceed with the operation

until the symptoms subside, which may be several hours later. In the smaller animals it may prove fatal by paralysing vital nerve centres and causing syncope or asphyxia. If one wanted to be certain of killing a dog by cocaine, however, it would be necessary to inject from 5 to 8 gr., according to size, which would be fatal in about half-an-hour, while from 2 to 3 dr. is necessary to be certain of killing a horse. The best antidotal treatment in susceptible animals appears to be the administration of either morphia or caffeine hypodermically, or a good dose of strong coffee, together with perfect quietness.

Owing to the toxicity of cocaine, a number of very useful synthetic substitutes have been introduced, their chief recommendation being that they can be used with greater safety in the smaller and more susceptible animals. These agents include novocain, B-eucaine hydrochloride, hydrochloride of urea and quinine, stovaine, holocaine 1 per cent., tropacocaine 2 to 3 per cent., acoine 1 :1000, and others.

I have had considerable experience with each of the three first-named, and I do not recollect having any untoward results from any of them, using them in precisely the same manner as cocaine. They each have certain advantages over cocaine, and, like cocaine, their effect is improved by a combination with a hæmostatic.

Novocain is a non-irritant local anæsthetic freely soluble in water, and may be sterilised by boiling. It may be used in similar strengths (2 per cent. to 5 per cent. solutions) as cocaine, and in much larger quantities without the danger of producing toxic effects. I consider novocain to be about the best of the local anæsthetics.

Hydrochloride of B-eucaine is also a very good local anæsthetic. Compared with cocaine it is less toxic, its action is longer in commencing, but also more prolonged. It can also be sterilised by boiling. It is often advantageous to combine cocaine and eucaine in order to obtain the quicker action of the former and the more prolonged action of the latter. When combined the solution should only contain half the percentage of each ingredient.

Hydrochloride of urea and quinine is probably the least toxic of all the local anæsthetics. It is effective in solutions of 1 per cent. to 5 per cent., and can be used on quite young animals with perfect safety, and it is very cheap. It is, however, very slow in bringing about anæsthesia, and requires to be injected

about thirty minutes before operating; while, on the other hand, its effects are very prolonged, extending in many cases even up to twenty-four hours. The advantage of this is, of course, very obvious in many of our patients, as it reduces the tendency of the patient to interfere with the operation wound during, at any rate, the first day. It does not appear to possess any effective hæmostatic property, and may be combined with adrenalin with advantage. I have amputated digits in dogs, and excised tumours in dogs and horses in comfort without any indication of pain in nervous animals that have objected strongly to the primary introduction of the hypodermic needle.

Spinal Anæsthesia.—Intraspinal injections of sterilised local anæsthetics introduced in the lumbar region may be used to produce anæsthesia in the posterior part of the body and the hind limbs. Under this anæsthesia quite serious operations in the human subject can be performed painlessly in patients for whom general anæsthesia would be dangerous. Macqueen and Woodruff, in "Veterinary Medicine" (Finlay Dunn), say: "The injection is made through the lumbo-sacral space at the point of intersection of two lines, one median uniting the last lumbar and first sacral vertebræ, the other transverse connecting the summits of the internal angles of the haunch." The entrance of the needle into the subdural space is indicated by the escape of cerebrospinal fluid. I have no experience of this method, and should with difficulty be persuaded to attempt it, since equally advantageous results in the smaller animals may be obtained by other means much less dangerous, such as the application of a local anæsthetic in combination with the administration of a full dose of morphia half-an-hour or an hour previously. The chief objections are the uncertainty of absolute asepsis, the difficulty of injecting the anæsthetic into the proper place, and without injury to the spinal cord, and the serious nature of the complications if they should arise in this particular situation. In the larger animals, moreover, the distance of the spinal canal from the skin renders the injection still more difficult.

The Combination of Morphia with a Local Anæsthetic.

Dogs frequently struggle considerably when put on the operating table simply from fright at the fact of being under restraint. In such cases the use of a local anæsthetic alone does not secure the necessary quietude for successful and easy operation, and the use

of morphia is a very great assistance. The dose injected hypodermically varies from ½ gr. in a puppy of the toy breeds to 2 gr. or even 3 gr. for adults of the large varieties. After such injection the dog usually vomits in from one to five minutes, and sometimes fæces and urine are evacuated. Narcosis is complete in about three-quarters of an hour. The local anæsthetic can then be applied and the operation proceeded with. One great advantage of this method is that the dog remains in a state of stupor for 18 to 24 hours, and so refrains from interfering with the operation wounds. For major operations involving the peritoneal cavity, a few whiffs of chloroform may be necessary, but great care must be taken as the excitant stage is practically non-existent and complete anæsthesia is very rapidly produced with a minimum of chloroform.

Chloral hydrate, administered *per os*, or injected into the peritoneal cavity in dogs, has not given such satisfactory results in my experience.

The use of morphia and of chloral hydrate in the horse have also been disappointing, and I have not persisted with them, mainly because I have always found the horse to be such an excellent subject for chloroform.

THE DEVELOPMENT OF SCLEROSTOMES IN HORSES. DIAGNOSIS, PROPHYLAXIS AND TREATMENT.

DR. A. ALBRECHT.

SCLEROSTOMES are the most frequent animal parasite of the horse, and they have been the object of many changes in nomenclature. In 1801 Rudolphi described *Strongylus armatus*. In 1831 Mehlis differentiated *Strongylus armatus* from *Strongylus tetracanthus*. In 1897 Pöppel subdivided the former *Strongylus armatus* into two forms: a larger form, *S. armatus Rud.*, and a smaller, *S. neglectus*. Stickler (1901) finally divided the earlier *Strongylus armatus* into three forms according to the tooth-like weapons of the mouth capsule.

1. *Sclerostomum quadridentatum*=*Strongylus neglectus*—Pöppel=*Strongylus armatus—Rud.*, in part=*Strongylus equinus*—Müller;

2. *Sclerostomum bidentatum*=*Strongylus armatus—Rud.*=*Sclerostomum vulgare*—Loos;

3. *Sclerostomum edentatum*—Loos=*Strongylus armatus*—Rud. Loos (1909) described many species of *Strongylus tetracanthus* in Egypt under the name "Cyathostomum."

Since the subdivision of sclerostomes into three parts is only recent the forms used in earlier investigations are not known. Our later knowledge shows that studies of infestation of the mesenteric arteries must have been conducted with *Sclerostomum bidentatum*, since this is without exception the form involved in arterial parasitism.

Glage (1906) found that *Sclerostomum edentatum* has a typical development in the subperitoneal tissue, and that it may infest any tissue covered by that membrane. Schlegel is of the opinion that subperitoneal development of this larval form is the chief cause of sclerostomiasis in colts. It frequently causes the formation of parasitic nodules in the lungs and liver that may be confused with the lesions of glanders.

Albrecht found sclerostomes as intestinal parasites in nearly every horse examined and believes this represents the usual condition. Eggs were found in the fæces of 42 army horses out of 44 examined; 18 of the 42 also carried eggs of *Ascaris megalocephala*. Post-mortem examination of the digestive system usually revealed numerous specimens of *S. bidentatum* and tetracanthum less frequently *edentatum* and *quadridentatum*. These were most numerous at the junction of the cæcum and colon.

Material for investigation consisted of eggs and larvæ taken from mature females, and from the fæces. Eggs of *S. tetracanthum* are larger and narrower than those of the other three species, which cannot be differentiated. In fæces they are always found singly, are elongated, have a thick wall, and are coloured yellow by the bile pigment of the intestines.

Development of the egg depends on the amount of oxygen and heat. At ordinary room temperature 2 to 3 days is required for the development of the embryo and separation from its covering. In a few days eggs are no longer found in the fæces, one only finds embryos, which are best termed larvæ. The larvæ are curved, have a long thread-like tail and a conical anterior end. The cuticle of the youngest larvæ is very delicate, but soon increases in thickness. After a time the outer cuticle gradually loosens until the larva is free in the old cuticula, within which it moves freely. This form may be termed the ripe larva. While the

XUM

larva in its earlier stages is non-resistant, especially to drying, it now becomes highly resistant and survives in fæcal balls that are completely dry on the surface. In a 0.5 per cent. formalin solution they remain active after twenty-four hours.

Distinct variations in the different larvæ are not present until after two to three weeks' growth, but in a warm temperature they may develop in a few days. The larvæ of the *tetracanthum* have a long tail, the anterior end of the body is more pointed, and there is a sharp demarcation between the body and the tail. The intestinal canal is shorter than in *bidentatum*. Larvæ of *bidentatum* are somewhat thicker than *tetracanthum*, the anterior end less pointed, the posterior end gradually passes into the thread-shaped tail which is shorter in proportion to the body. In *S. tetracanthum* the intestinal canal is enclosed in 8 to 9 large cells, in *S. bidentatum* in 32 cells mosaic in form and arranged in double rows.

After moulting the body retains its length, but the tail is lost; it is now known as the rhabditis form (rod-shaped) and has a short posterior end.

In Albrecht's investigations the larvæ remained in their sheaths for 8 to 9 months when kept in fæces or water. When they are placed in a moist oven at 35 deg. C. for several days many are separated from the sheath. According to Baillet this process of moulting occurs in 15 to 20 days, but the observations of Albrecht indicate that this first moulting process does not usually occur in the outer world, but after entering the host. After moulting the dried larvæ possess great vitality and were observed to retain life for five months in ordinary water without special nourishment.

Sclerostomes in fresh fæces were confined to eggs in a state of division; they were never found just before or immediately following the first moult. In the intestinal contents of slaughtered horses larvæ were found in only one case, but many sexually mature individuals were found, especially at the junction of the cæcum and colon. The larvæ may be found in fæcal matter three days old, and in contaminated straw. When one places a fæcal ball that is at least three days old in a glass dish, pours over it a physiological salt solution of pure filtered water so that the bottom is covered with a few millimetres of liquid, the larvæ soon wander to the water and with good light may be seen with the unaided eye. They have

the appearance of small worms, move actively, and through the entanglement of their tails may form distinct balls.

It is probable that the larvæ are taken through the digestive tract. Segmented or embryonic eggs ingested with food or water are not capable of further development. The process of wandering from fæcal balls to water occurs in pastures, where under proper moisture conditions the larvæ become attached to grass. Animals at pasture are more subject to infestation than when hitched in stables, though the habit of nibbling dirty straw in stables is a common method of ingestion.

As in all parasitic diseases the gravity and nature of the disease and the intensity of the symptoms are in direct proportion to the number of invaders. A few sclerostomes seem to cause no symptoms. *S. bidentatum* and *S. tetracanthum* are largely infestations of young horses. Larvæ that cause aneurisms in the anterior mesenteric artery cause lesions that remain during life. In addition to causing embolisms, larvæ that wander as individuals into the terminal vessels of the intestines give the first impetus to intestinal diseases (colic). Under ordinary development the ingested larvæ, without intermediate carriers, develop directly through several moultings into sexually mature individuals in the intestines. In other cases larvæ leave the intestines via the blood stream and are carried to the greatest variety of body organs where they should be regarded as strayed individuals. It is highly improbable that the development of the sexually mature *S. bidentatum* depends on the passage of the larvæ through the mesenteric arteries.

It is very important to find means to prevent the ingestion of larvæ with the food and thus prevent the migration of the parasites to the intestinal arteries of the horse. Diagnosis is highly important in providing for prophylaxis, and it is very easy to determine the presence of sexually mature parasites in the intestinal canal through finding the eggs in the fæces. With a pincette remove from a fresh ball a piece about the size of a pea. Place it on a slide and separate it with a few drops of clean water. After bringing to a thin film examine with a 100 to 150 magnification. Short forms of eggs indicate the three large species, while long oval eggs characterize *S. tetracanthum*. The following method of diagnosis may also be used: Place a ball of the suspected fæces in a clean vessel and protect against drying, let it remain 8 to 14 days, pour over it clean water until it is completely saturated and a

XUM

small amount of water remains in the bottom of the dish. After a few hours pour off the water and examine it for larvæ. In warm weather the larvæ are usually present in 5 to 8 days, or the process may be hastened by keeping the fæcal ball in a warm, moist place.

After larvæ reach the arteries and tissues they are not accessible, so that their suppression in the intestines assumes great importance. All infested animals should be kept from pastures until free from parasites. Carefully remove all fæces from the stables, and prevent fæcal contamination of food and water, though water is not the most frequent carrier of the larvæ. In all intestinal diseases of the horse more attention should be paid to an examination for parasites and eggs. As a vermifuge Albrecht considers turpentine with linseed oil more effective than tartar emetic, which has little or no effect on intestinal sclerostomes. Horses given maximum doses of tartar emetic may still carry eggs of sclerostomes in their fæces. The administration of 80 c.c. of oil of turpentine in 500 c.c. linseed oil has been followed by the expulsion of numberless ascaridæ and many sclerostomes. Since the colour of the sclerostomes so closely resembles that of fæces one must examine the latter very carefully for expelled individuals. Sclerostomes are best destroyed by burning, since thousands of larvæ may develop within a dead female.—D.H.U., *Cornell Veterinarian.*

Clinical Cases.

PARACENTESIS ABDOMINIS.

By P. G. BOND, M.R.C.V.S.

Plymouth.

I HAVE had two cases of colic lately, which cause me to conclude that the above operation is not resorted to as often as it should be.

In one instance I was called to attend a mare about 18 hours after the attack commenced. Up to this time she had been drenched by the farrier, a man who has acted as such for 40 years. It was then too late to save her; she died within half an hour of my visit. The case appeared hopeless from the start.

Post-mortem examination showed twist of the large intestine, (the colon). In the other case, also a mare, she was found very ill about 8 a.m., and had been so apparently all night. Brought to the Infirmary about 10 a.m. Too late to treat effectively; she died at 4 p.m. Post-mortem examination showed a double twist of the large colon.

In my opinion, had both patients been tapped in an early stage the chances were they would have recovered. All kinds of drenches had been given the first mare, none to the second.

I will try and explain why I think tapping should be done oftener than it is. It must be done in a fairly early stage of the attack.

No. 1, 30 years since, occurred in 1886. Subject a cart mare, the property of a miller. Mare 11 years old. She had an acute attack of colic, and became very much distended at the flanks.

I saw her first about 9.30 p.m., and gave the usual colic drinks. At 10.30 she became worse, and although I had never seen it done, I decided to perform the puncturing operation, which I did. The mare was easy at once.

After I had introduced the cannula I was at a loss as to how long it should remain in. Being undecided, I waited, with the result that I fell asleep in the stable and slept until about 4.30 a.m. The mare appeared easy and comfortable when I awoke. I let

the cannula remain in until 8 a.m. She recovered without any ill effect except that a slight attack of laminitis followed. She got over this, was bred from, and continued to do good work, was then lost sight of.

No. 2 was that of a hunter, aged 5 years, the property of a dealer.

The attack was so bad that I persuaded the owner it was a case of "kill or cure." He consented, and I tapped the colon. Relief was instant. The animal quickly recovered.

This was the first time the dealer had ever seen it done, although he commenced business in 1860, and he had assisted his father previously, who was in business in 1845. The owner had never heard of it from his father.

No. 3, subject a farm horse, aged 9 years old.

Operation thought advisable, was carried out. Animal recovered but an abscess succeeded the puncture. It got to the size of a cocoa-nut. Became ripe, was opened and dressed. It gave no further trouble.

No. 4. That of a tram mare, aged 17 years. At the time of operation was frequently subject to colic. Operated upon in one bad attack about three years since. She recovered, is working now and has only had two slight attacks since, the illness in which we thought to have lost her being quite forgotten by owner.

No. 5. A cart mare, a heavy vanner, aged 12 years. Subject to colic. Was operated upon three years since. Recovered, put to work, and continued without any trouble until last week. She had then an attack and soon died. Showed on post-mortem examination a double twist of the intestine, the large colon.

This is one of the two mares named at first.

I examined the colon to see if any cicatrix remained from the first operation, but found nothing definite.

The trocar and cannula used, Arnold's, fig. 857 in their catalogue. My colic box is not complete without the instrument.

The region selected to operate on is fixed by drawing an imaginary line from the pin bone to the flank. A hand's breadth in front of this is the place to puncture, or where the swelling is highest, put the trocar inwards and downwards.

The portion of the intestine pierced is the pelvic flexure of the large colon on the off side.

The cannula can be secured by a piece of tape if necessary and tied round the abdomen.

It is rarely any after trouble ensues and the operation produces a good result. Is quick and safe.

The old treatment of drenching with opiates is not always successful. A very useful colic draught I give in conjunction with the tapping is as follows:—

Tinct. Aconite, Flemings'	10 minims
Sp. Vini Rect.	1 ounce
Chloroform	20 minims
Sachar Ust. q.s. at pleasure	
Aqua ad ...	10 ounces

This can be repeated in an hour. Two doses usually suffice.

I only send this to give our younger practitioners the assurance that, of my own experience, with ordinary care they will not regret resorting to this beneficial operation.

COITAL OR VESICULAR EXANTHEMA IN THE HORSE.

By R. C. G. HANCOCK, B.Sc., M.R.C.V.S.

The note on Vesicular Exanthema in the July number of the Veterinary Journal is interesting, as it corroborates an experience of my own when a student.

A miller called at the surgery, saying one of his mares that had been served three days previously by a local stallion had got "clap." I saw the case, and found that the vaginal mucous membrane had three or four well-marked raised ulcers, flat-topped, and about the size of a sixpence. Their surface was bright red. The ulcers had the appearance of having been stuck on artificially. There was another ulcer on the hairless skin of the vulva, and one on the buttock, where the penis of the stallion could have easily come in contact during copulation.

There was a yellowish discharge from the vagina. I ordered a weak irrigation twice daily with lysol, and salines in the drinking water.

I returned to college next day, but heard later that the mare was all right in ten days, so that from the date of service about a fortnight elapsed.

It is more probable that spontaneous recovery had occurred, as the affection seems quite benign and heals with or without treatment in about a fortnight.

A CASE OF PRIMARY INFECTIOUS OSTEOMYELITIS IN THE HORSE.

By Prof. SCHWENDIMANN, of Bern.

THERE can no longer be any doubt as to the occurrence of this disease in animals. Different observers (Frohner, Karnbach, Chenot, etc.) have conclusively proved it. Experimentally, Lexer and Rodet have proved it by causing acute osteomyelitis in rabbits by the intravenous injection of *Staphylococcus pyogenes aureus.*

According to Schuchardt hæmatogenous ostitis occurs chiefly in young, growing persons at the most vigorous bone growth (8 to 17 years old). It is often the result of trauma. Acute central osteomyelitis may also occur in animals, a swelling develops, pus forms, presses through the Haversian canals, and an abscess appears superficially in the periosteum.

In a number of cases infection begins in the periosteum, spreads to the Haversian canals, and invades the whole medullary cavity. As portions of the periosteum become loose and the marrow infiltrated more or less extensively, necrosis sets in.

The organism concerned is chiefly *Staphylococcus pyogenes aureus.* Trauma plays a great rôle in the production of the malady, not only in the form of chills, over exertion, but also by direct bruising, and concussion through a fall or a blow.

In animals, in addition to the previously-named disease, a cryptogenetic infectious inflammation of the bone marrow occurs, which is similar to the human maladies.

Staphylococci and streptococci, as well as strangles bacilli, which gain access to the bone marrow by the hæmatogenous route, bring about the affection.

Whilst the source of the ailment cannot always be proved, the development of bacteria is always brought about by a trauma (contusion or concussion). In horses only the phalanges have hitherto suffered. In this case a sudden high degree of lameness occurs, a hard swelling and thickening of the bone arises. After about a week circumscribed fluctuation, abscess and fistula formation result.

Prognosis is bad.

The following case of primary infectious osteomyelitis and ostitis of the pedal bone occurred in my practice.

A battery horse 14 years old, developed sudden acute lameness on September 8th, and was evacuated to the military hospital at Bern. There was increased pulsation of the arteries at the fetlock, increased warmth of the foot, severe pain on palpation and percussion. These symptoms bore no relation to the degree of lameness. Moderate, but not specially painful, swelling in the region of the toe at the coronet. Rigid examination of the cleansed and freshly trimmed whole ground surface of the foot showed not a trace of injury or deeper strain. The skin round the foot was quite intact, and there was no trace of injury or purulent process.

On the eighth day the animal seemed in great pain, so antiseptic poulticing, undertaken from the first, was discontinued. There was a circumscribed swelling of the coronet at the toe, on the solar surface of the foot near the white line there was a painful zone. A funnel-shaped opening was made and some greyish-yellow thick pus was evacuated. There was no improvement, and the horse was slaughtered on October 8th.

Post-mortem revealed a total recent fracture of the pedal bone. The break line went through the middle of the external wall, sole and joint surface. A necrotic destruction of bone was visible, and a roundish nut-sized sequestrum was removed.

There was no trace of callus formation. The hoof joint showed only trifling inflammation and the cartilages of the joint, apart from the fracture, were uninjured. The pus contained, besides putrefactive bacteria, different kinds of cocci.

The great destruction of bone, together with the relative intactness of the pedal joint, established the conclusion that the fracture occurred late in the course of the disease, perhaps at the moment of unloading at the slaughter house, whilst the origin of the malady was a primary infectious ostitis and osteomyelitis of the pedal bone. The absence of any injury or breach in the horny covering of the foot pointed to cryptogenetic infection.—*Swiss Journal of Veterinary Medicine.*

A PECULIAR SKIN DISEASE OF CATTLE IN N.W. RHODESIA.

By J. MALCOLM ARMFIELD, G.V.O.,

Lusatra, N. Rhodesia.

Within the last two or three years a new and very troublesome skin disease has manifested itself amongst the cattle of this territory. It has accounted for serious mortality in European owned herds, but strangely enough in my particular district I have never observed it in cattle owned by natives. Nevertheless, other district veterinary officers have reported native stock badly affected. Calves under one year old are not attacked.

Very frequently the disease first manifests itself between the hind legs and on the udder; another favourite position is on the thin skin beneath the elbows. But it is also found on the muzzle, along the spine, on the tail, and enveloping the entire limbs—indeed, in advanced cases I have seen animals with literally not a hand space of skin unattacked.

A characteristic lesion is as follows:—Small villous-like growths, about the size of large peas, protrude from the skin; these growths have a roughened surface, and are grey in colour, sometimes not unlike small warts. If one of these is pulled off, a small hollow is left in the skin. Pruritius does not seem to be present.

Cause.—Research work in the laboratory has so far failed to find any specific causal agent.

Many consider the bont tick (*Amblyomma hebræum*), or a smaller variety of tick to be responsible.

One certainly frequently notices the disease between the fore limbs, between the hind limbs, and on the udder, co-existent with bont ticks. But if the disease is merely caused by the irritation of the ticks, how is it that lesions appear by the spine and on the nozzle, places where bont ticks are rarely found?

It is possible that an organism or a toxin enters the blood stream as the result of a tick bite, and the disease is thus spread to these distant positions.

I have noticed what certainly appeared to be identical lesions, just above the hocks of milch cows, where the limbs had been tied together for milking.

Contagion.– We have never been able to experimentally transmit the disease from one animal to another. We have tried rubbing diseased skin scrapings, taken from a sick beast, into the coat of a sound animal. Also binding scrapings on to an unaffected animal by means of bandages. But the result in both cases was negative.

But, nevertheless, some have declared that the disease gradually spreads from one animal to another. My experience has not been like this. I have seen a very bad animal herded with clean cattle for several months, without spreading the trouble.

Treatment.—At the experimental camp all sorts of external applications were tried, and at length the following conclusions were arrived at:—Bad cases are incurable; medium cases can be cured, or, at any rate, much improved by the application of calcium sulphuret solution prepared as follows:—

Quick lime	...	...	...	...	1 lb.
Sulphur	...	...	...	...	1 lb.
Water	...	...	...	...	1 gallon.

Simmer the mixture over a slow fire for three hours, and apply when warm. Leave on for three days, wash off, and apply again if necessary.

Combined with frequent dipping in an arsenical bath, this was found to be the more satisfactory line of treatment. Several owners of large herds declare that the disease cannot appear in cattle regularly dipped, but I have recently spoken to a trustworthy man, who affirms that he has experienced the reverse condition amongst his animals.

Conclusion.—Unfortunately, shortage of men, owing to the war, is preventing further research work upon this alarming malady, and other equally important ailments in this country.

But the losses resulting from this disease have scared many farmers into building dips, so that it is to be hoped that an improvement in the general condition of the stock will be noticed.

For undoubtedly more than half the trouble amongst the cattle in the country is caused by ticks.

I believe the animal mortality from poverty caused by loss of

blood from sucking ticks alone is very considerable. And on top of this we have to consider the numerous specific infections transmitted by ticks.

It is quite possible that poverty may play some part in the causation of this troublesome skin affection.

HYDROCELE IN A YEARLING BULL.

By R. S. HEER,
Platteville, Wis.

One of the most interesting cases that came to my attention during the past year was that of a pure-bred Guernsey bull owned by Charles Wilkins. First inspection revealed a very large hydrocele of the left scrotal sac, the scrotum extending below the hocks. After making a careful examination, I concluded that aspiration of the fluid would be the proper procedure, so I disinfected the skin of the scrotum and introduced a horse trocar and cannula. A large quantity of bloody fluid was withdrawn. Following the aspiration, I injected a 25 per cent. solution of fluid extract of thuja.

Ten days later I was called again and found the scrotum as large as ever, but a great deal harder. I again introduced a trocar, but this time the contents of the scrotum were so thick and flaky that only a small amount came away through the cannula. I then made an incision large enough to admit one finger, and found the entire left scrotal sac lined with a tough membrane about an inch in thickness. A large quantity of a thick flaky fluid resembling the contents of a neglected hygroma of the withers was present. I enlarged the scrotal incision, so that it would admit my hand, and then proceeded to remove the mass of tissue, which seemed to be of a fibrous nature. After all of the diseased tissue had been removed, the scrotum was flushed with Lugol's solution, then packed with sterile gauze, which was left in for twenty-four hours.

The subsequent treatment consisted of a daily flushing with a 1 :2000 bichloride solution. In four weeks the scrotal wound was healed. At the end of that time the scrotum had regained its normal size and shape.

Eight months later the Wilkins herd was tuberculin tested, and this bull reacted to the test. I am inclined to believe that the hydrocele was due to tuberculosis of the testicle, or its appendages. —*Wisconsin V.M.A.*

THE IMPROVEMENT OF LIVE STOCK IN ENGLAND AND WALES.*

THE first Report (Cd. 8017) on the operation of the Live Stock Scheme, which was published in July, 1915, contained the regulations governing the award of grants, with so full an explanation of the objects of the scheme that it is unnecessary to repeat these in detail. It will suffice to say that the grants, which are made out of funds provided by the Development Commission, are of the following amounts:—

Heavy Horse Societies—A grant not exceeding £80 (£40 direct and £40 for assisted nominations) in respect of each stallion subsidised.

Bull Societies—A grant of £15 in respect of each bull if provided by a society, and of £12 if provided by an individual.

Boar Societies—A grant of £3 in respect of each boar.

Milk Recording Societies—A grant equal to half the expenses of the society, but not exceeding £50 per 20 herds.

The chief aim of the scheme is to educate breeders to the value of using good sound pedigree bulls, stallions, and boars, instead of the nondescript and unsound sires whose chief qualification has often been the low fees at which their services could be obtained. Financial assistance is also given to dairy farmers to encourage them to keep records of the milk yields of their cows. The scheme is thoroughly practical, as well as educational, as, under it, sires of merit are provided for the use of farmers at low fees by means of grants paid to the owners of the sires. Incidentally, the advantages of co-operation are demonstrated, as the benefits of the scheme are confined almost entirely to farmers who join boar, bull, heavy horse, and milk-recording societies.

For purposes of administration, the country has been divided into twelve provinces, and in each of these a live stock officer has been appointed. He is attached to a selected agricultural college or institution in the province, and is responsible for the promotion

*This article constitutes the report on the Administration of the Grant for the Improvement of Live Stock in England and Wales for the year April 1, 1915, to March 31, 1916. For the sake of public economy the usual annual Reports are not at present being issued.

of the scheme in his area. Owing to the fact that these officers are men with much practical knowledge and experience of the breeding of live stock their advice and assistance in the selection, purchase, and care of stock is sought, and increasingly so, by farmers and breeders. In some provinces there was an unavoidable delay in the appointment of live stock officers, and it was explained in last year's Report that there were on this account some districts where the scheme had hardly begun to operate. During the year now under review a fair trial has been given to it, and, as far as can be ascertained at present, the scheme has been favourably received on the whole, is working satisfactorily, and if continued for a long enough period of years it promises to have a very beneficial effect on the live stock of the country, especially on that bred by the small farmer and small holder.

In most provinces some counties are more eager than others to avail themselves of the grants. In the backward counties, where the live stock is in greatest need of improvement, it is usual to find the greatest difficulty in getting the scheme taken up, and if grants had not been reserved for such districts more rapid progress could have been shown in the more progressive counties. Particulars of the grants authorised for each province and of the number of animals actually subsidised are given in the Appendix.

It should be remembered that the scheme is only in its infancy. No sires were provided under it till February, 1914, and, except for the first seven months of its existence, it has had to contend with war conditions. Many of the young and most progressive farmers and farmers' sons have joined the Army; labour has been scarce on most farms; feeding-stuffs for stock have been dear to buy, and at times difficult to obtain, and, with the increase in the price of meat, the price of bulls has gone up. In spite of these drawbacks every branch of the scheme has made considerable and steady progress, and the number of sires provided in 1915-16, shows a considerable increase on that of 1914-15, as will be seen from the comparative table.

The progress made in little more than two years is encouraging. Many years must, however, elapse before the object of the scheme is likely to be secured, as farmers will not be convinced, except by practical results, that it is a paying proposition and commercially

sound to use high-class sires whose service fees are double, or even five times as much as those that they have been in the habit of paying in the past. When farmers, who are members of bull, boar, or heavy horse societies, find that their young stock mature earlier and grow into more money than those got by nondescript sires, then, and not till then, will the benefits of the scheme be fully realised and valued.

The assistance given to live stock officers by members of the provincial and county live stock committees has been of considerable service in the promotion of the scheme, and the thanks of the Board are due to them, and especially to the chairmen of the county committees, for their active co-operation and help.

Year, (1st April-31st Mar.)	Boars.		Bulls.			Horses.		Milk Recording.	
	No. of Societies.	No. of Boars.	No. of Societies.	No. of Individual Owners.	No. of Bulls.	No. of Societies	No. of Stallions.	No. of Societies.	No. of Cows.
1914-15 ...	100	107	285	26	370	65	72	16	7,331
1915-16 ...	180	193	489	28	633	88	97	20	9,811

Grants for Bulls.—No part of the live stock scheme has been more keenly taken up and appreciated than the bull section. The number of applications for grants has considerably exceeded in some provinces the number of grants available, and therefore the opportunity has been taken to exercise careful discrimination in the selection of societies and sires. There has been also a gradual weeding out of sires which were not considered to be up to standard. In some cases, too, societies which were somewhat hurriedly formed when the scheme first came into operation have not proved altogether satisfactory, and these have been reconstituted on a sound basis, or the grants have been transferred from them to more promising societies.

The number of bulls located at the close of the year 1915-16 was 633, of which 605 were provided by 489 societies, and the remainder by 28 individual owners. Of these bulls, 461 were located in England, and 172 in Wales. The number of bulls actually purchased and owned by societies was 73, the other 532 being hired by societies from bull owners.

The number of bulls located in each province varied considerably, but this is to be expected as in some counties—such as Cumberland

and Westmorland—the supply of good bulls is large and there is little need of Government assistance.

The popularity of the Shorthorn is evidenced by the fact that of the 633 bulls subsidised, 425 are of that breed. The other breeds are Hereford (70), Lincoln Red (47), Welsh Black (35), Devon (34), South Devon (15), Aberdeen Angus (5), one Jersey and one Guernsey.

The Shorthorn also showed the highest average price with £41. Lincoln Reds and Herefords averaged approximately £40, Devons £39, and Welsh Blacks £28. The average price of all the subsidised bulls was approximately £40.

The service fees of these bulls varied from 2s. 6d. to 7s. 6d. At the former figure, 267 bulls were serving; a charge of 3s. was made in respect of 100 bulls, and one of 5s. for 134 bulls.

It is too early yet to estimate the general effect of the provision of good bulls, but evidence is available that the value of the calves sired by the subsidised animals is usually higher than that of calves got by non-pedigree bulls, and little difficulty is apparently experienced by members of bull societies in disposing of their calves for rearing, and the demand for the heifer calves is much greater than the supply.

Numerous instances have been reported of farmers who are buying a few pedigree cows now that good sires are available to serve them, and at a recent sale of a well-known pedigree herd of shorthorns, 16 animals (2 bulls, 11 cows, and 3 calves) were purchased by members of subsidised societies who, in the opinion of the live stock officer in the district, would have been unlikely to attend the sale if the live stock scheme had not been in existence.

Other indirect and beneficial results of the operation of the scheme may be noted. In some districts where bull societies exist, farmers, who have been for years in the habit of keeping indifferent sires, are now buying good pedigree ones, as they do not like to keep bulls which are inferior to those which their smaller neighbours are now using.

Breeders of pedigree cattle are beginning to realise that the live stock scheme is creating an additional home market for pedigree stock, and they may be relied on to cater for it. In this

connection it is interesting to note the following extract from an article in Volume 6 of the Welsh Black Cattle Herd Book, which was recently issued: "It is significant that there should be such a large number of entries for the present Volume of the Herd Book, which appears at a time when there is likely to be a demand for well-bred bulls for the purposes of the live stock scheme of the Board of Agriculture and Fisheries. It is scarcely too much to say that there never has been anything so far in the history of Welsh Black Cattle that has done more than the live stock scheme has done to bring home to the ordinary breeder the necessity for systematic effort in breeding if the breed is to have a future."

It is evident, therefore, that the bull scheme, though it has been in operation little over two years, is having direct and indirect beneficial effects which must in the course of time tend to improve the cattle-breeding industry of the country.

Grants for Boars.—There were 193 boars subsidised in 1915-16, being an increase of 86 on the number located in the previous year. The progress in this section of the live stock scheme for the year under review is not altogether unsatisfactory when the difficulties of forming societies are taken into account and allowance is made for the war conditions that prevail. In some provinces there is apparently little demand for good boars, and great difficulty is experienced in persuading small pig-breeders to form societies to take advantage of the offer of the £3 grants for the provision of boars. In two or three provinces, however, this part of the scheme is fully appreciated, and the grants are much sought after and taken up.

Of the 193 boars located, 91 were Large Whites, 43 Large Blacks, 18 Gloucestershire Old Spots, 15 Berkshires, 14 Middle Whites, 10 of the Lincoln Curly Coated Breed, and 2 Large White Ulster, and the average price was £7 12s. 6d. per pig.

The service fees varied from 5s. down to 1s.; the most popular fee was 2s. 6d.

The insistence of the Board in refusing to make grants in respect of non-pedigree boars has resulted in the establishment of herd books for two well-known breeds of pigs, the "Gloucestershire Old Spots," and "The Cumberland," which are to be found chiefly

in the counties from which they take their names, and in counties adjoining them. The value of pigs of these breeds will be enhanced when entered in herd books, and the demand for them is likely to be increased.

Grants to Heavy Horse Societies.—Satisfactory progress has been made with this part of the live stock scheme—the number of societies operating in 1915 being 88 with 97 stallions, as compared with 65 societies and 72 stallions in 1914—and 62 of the 88 societies have been formed since the scheme was initiated in 1914.

A heavy horse society covers, as a rule, a comparatively large area, and includes in its membership many of the leading and larger agriculturists of the district, and the success of these societies and the example of prominent farmers have doubtless encouraged the smaller farmers to join local bull and boar societies.

The number of mares served by the 97 subsidised stallions was 9,122, an average of 94 mares per horse. Assisted nominations, that is to say, payments not exceeding half the normal service fee, were made by the Board in respect of 2,430 of these mares which belonged to farmers whose holdings did not exceed 100 acres.

The average hiring fee paid for these stallions was £241, and the average service fee approximately £2 10s.

In Cumberland and Westmorland somewhat different procedure has been followed from that adopted in the rest of the country. The live stock committees in these two counties made representations to the effect that the number of good, sound stallions travelling in their districts was sufficient, and that the funds authorised should be utilised solely in the award of assisted nominations for the service of mares belonging to small farmers of 100 acres or under. The Board approved of the proposal, and a society was formed whose operations covered the two counties. Committees were appointed to inspect and select stallions for the service of mares. The service fees of these stallions varied from two to three guineas, the average fee working out at £2 7s. Assisted nominations,—*i.e.*, half service fees—were paid in respect of 385 mares which were served by 52 selected stallions, and, thanks to the energy and activity of the members of the selection committees

and of the secretary of the society, the arrangements were well carried out, and should prove of considerable benefit to small farmers, as they were enabled to secure the use of better horses than they had been previously accustomd to do.

The approval of sires is left to the selection committees of the societies, and in some few instances it is open to question whether full value is obtained for the hiring fees paid. There is, however, no doubt whatever that the majority of the members of these societies are getting better value for the money expended by them in service fees than they did previously, when they made their own selection of stallions, which, as a rule, depended more on the amount of the service fee than on soundness, pedigree, and conformation.

The scheme has already done much to educate mare-owners to the advantage of combining in order to secure a stallion that is certified sound, is well bred, and of good make and shape. The provision of subsidised stallions, and the scheme under which stallions are registered as sound by the Board are reducing the number of unsound tramp stallions, and, in course of time, should drive them off the road. Farmers are realising more than they did formerly the advantages of using sound sires, and they now hesitate to use a stallion unless certified sound.

However many rosettes a stallion may win in the show-ring, the qualification that most concerns the mare-owner is that of foal-getting, and it is on this most important point that the Board endeavour to obtain information in regard to the stallions recommended for grants. Considerable difficulty, however, has been experienced in getting accurate foal returns, and though the secretaries of the societies take active steps to secure the particulars desired in regard to subsidised sires they often fail to do so because mare-owners will not take the trouble to reply to the enquiries made. Mare-owners often fail to realise their responsibility in the matter, and appear to forget that the information is being collected for their benefit, as no grant is made in favour of a stallion—however good a show-horse he may be—if his foaling record over a period of two consecutive years is a bad one. Payment by results, the system which to a great

extent is followed in Scotland and the North of England, has much to commend it, and the adoption of it in England is well worthy of consideration by horse societies in making their agreements with stallion owners.

Milk Recording Societies.—The milk-recording section of the scheme cannot make much headway under present conditions. Even in normal circumstances farmers are generally loth to embark upon a scheme which is new to them, and of which the financial benefits are not at once apparent. Farm labour is scarce, and, as pointed out in the Report for last year, many of those most likely to be interested in the scheme, and to make it a success, joined the army in the early stages of the war. Satisfactory recorders are increasingly difficult to secure, and in some cases societies have been badly served in this respect, and, in consequence, have not met with very encouraging success. It is satisfactory, however, to record that notwithstanding these difficulties the number of societies has shown a slight increase during the year, and that all the societies that were in existence at the beginning of the year covered by this Report are still "carrying on." In the case of those societies who have had good recorders the results of the year's working have been generally satisfactory, and there is every reason to hope that when conditions are less abnormal the results of this important part of the live stock scheme will fully justify the efforts which are being made to secure its adoption.

The ultimate success of the scheme must depend on the commercial advantage to be obtained from it, and it is satisfactory to be able to report that a member of a milk-recording society, who disposed of his herd last November, estimated that the possession of the milk-record certificates for his cows, which had been issued by the Board, and which were handed round at the sale, had the direct result of increasing the prices made by quite £200 over what would have been paid for his cows if they had not been sold with the Board's certificates.

Several other cases have been brought to the Board's notice of the commercial value of a milk-record certificate. Bull calves, out of cows with good *certified* records have made from £5 to £10 more than their ordinary value. An offer of 50 guineas

each for two in-calf non-pedigree cows, whose records were 800 and 900 gal., respectively, was recently refused by a member of a milk-recording society. Another society reports: "There has been a splendid sale of bull and heifer calves from milk-record cows; forty enquiries for calves were received as the result of an advertisement in an agricultural paper."

The number of certificates issued during the year was 637, and the demand for them came, as was to be expected, chiefly from the most progressive of the societies. A large number of the certificates issued were in respect of cows with milk records of over 700 gal., and one cow, whose records were taken daily, gave 1,774 gal. in the year. There is no doubt the demand for certificates will increase considerably when their commercial value becomes more widely known and appreciated.

Several milk-recording societies have started registers of calves out of recorded cows. These calves are tatooed in their ears when a few days old with permanent identification marks, and particulars of their breeding and of the milk yields of their dams are recorded in the register. By this means a purchaser of these calves either when young or full-grown, is able to form some idea of their suitability for a dairy herd, instead of judging, as is now usually the case, merely by inspection, which by itself affords an unreliable guide in the selection of young stock for dairy purposes.

The number of milk-recording societies in operation at the end of the year now under review was 20, as compared with 16 in the previous year. There were 350 members, and they owned 398 herds numbering, approximately, 9,800 cows. The increase in the number of societies, members, and herds, is not large, but in these abnormal times even a slight increase suggests a not unfavourable outlook for the formation of milk-recording societies after the war.

The accounts of these societies, which have completed a year of operations, show that the average cost to a member is less than 2s. per cow recorded, exclusive of the initial cost of purchase of weighing balances and other equipment of a permanent nature which may be regarded as capital expenditure.

When the financial value of a milk-recording certificate is realised and appreciated an annual outlay of 2s. per cow should be considered a really good investment, and will, in time, no doubt

be regarded as such, and tend to a steady development of milk-recording under this section of the live stock scheme.

The following are the principal memoranda and forms used in connection with the live stock operations of the Board, and copies of them can be obtained free of charge on application to the Secretary, Board of Agriculture and Fisheries, Whitehall Place, London, S.W.—

L[1]. Memorandum on the Live Stock Scheme.

L[2]. Regulations as to Bull Grants.

L[3]. Regulations as to Heavy Horse Grants.

L[4] and L[7a]. Regulations and memorandum as to Milk Record Grants.

L[11]. Regulations as to Boar Grants.

Appendix.

List of Grants which were Authorised, and the number of Sires and Milk Recording Societies which were Subsidised in the Year from April 1, 1915, to March 31, 1916.

Province.	Boars.		Bulls.		Horses.		Milk Recording		Total Authorised for Province.
	Amount Authorised.	Sires Subsidised.	Amount Authorised.	Sires Subsidised.	Amount Authorised.	Sires Subsidised.	Amount Authorised.	Societies Subsidised.	
	£		£		£		£		£
1. Armstrong Col'ege ...	40	4	305	14	826	*5	250	2	1,421
2. Manchester University	48	2	1,398	45	480	1	500	1	2,426
3. Leeds University ...	80	15	1,094	71	870	12	400	nil	2,444
4. Harper Adams College	60	14	1,107	46	480	10	400	nil	2,047
5. Midland College ...	64	16	1,080	68	720	6	400	4	2,264
6. Cambridge University	212	7	1,218	26	1,760	10	450	4	3,640
7. South-Eastern College	56	10	678	21	400	4	250	1	1,384
8. Reading College ...	188	23	918	41	740	9	400	2	2,246
9. Bristol University ...	118	45	1,495	90	1,033	14	600	5	2,246
10. Seale-Hayne College	60	7	1,058	39	560	5	400	nil	2,078
England	926	143	10,351	461	7,869	76	4,050	19	23,196
11. Aberystwyth College	108	31	1,575	101	960	12	484	1	3,127
12. Bangor College ...	80	19	1,125	71	720	9	352	nil	2,277
Wales	188	50	2,700	172	1,680	21	836	1	5,404
England and Wales	1,114	193	13,051	633	9,549	97	4,886	20	28,600

*Exclusive of the Cumberland and Westmorland Society.

From *The Journal of the Board of Agriculture.*

DEATH OF CAPTAIN J. P. HEYES.

THE war has robbed the profession of one of its most capable members in the person of Capt. J. P. Heyes, whose death is announced in a letter from Mr. T. G. Millington, brother-in-law to the deceased officer, saying that Mrs. Millington received a telegram from the War Office of her brother's demise in Malta. Capt. Heyes some time before the outbreak of hostilities accepted a commission in the East Lancashire Divisional Veterinary Service, and when the Manchester Brigade was mobilised in August, 1914, he went out with it to Egypt, and thence to Gallipoli, during which journey he had a remarkable experience in that the Fleet suffered a serious loss whilst the vessel by which he was travelling was in the vicinity. In the course of his services in this theatre of war, Capt. Heyes had great responsibilities placed upon his shoulders, and we have it on the authority of soldiers who have returned that no one worked harder than did the deceased gentleman in furtherance of the success of our arms. Some time ago Capt. Heyes had an attack of dysentery, and following that he was knocked from his horse by a motor transport and was badly injured, with the result that he was sent to Florence to recuperate. He improved and returned to Malta to pursue his work, and there fell a victim to sunstroke, which proved fatal on the 5th July.

In civil life Capt. Heyes was a veterinary surgeon, with premises in Upper Dickonson Street, Wigan. His ancestors had claimed this town as their home for a very long time, and Capt. Heyes' father was a shoeing smith. At twelve years of age he left school and assisted his father in his business, and at the age of sixteen had made such progress that he successfully competed at agricultural shows in various parts of the country against the leading shoeing smiths of the day. He acquiesced in his father's wish to become a veterinary surgeon, and at 19 years of age he proceeded to the Royal Veterinary College, where he quickly came to the front, so much so, that he qualified for and was offered the position of hospital surgeon to the college. This appointment he accepted, and about two years later he returned to Wigan and set up practice. Since then he had made much headway and built up a lucrative practice, which he sacrificed when he became a soldier.

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In 1905 Capt. Heyes contested St. Andrew Ward for a seat in the Town Council, but was unsuccessful, though in the following November he secured the verdict by a large majority. Since that time he continuously represented the biggest ward in the borough, and his death, therefore, removes a highly esteemed member from municipal circles. He was a member of the Conservative party, but for his independence of spirit and his straightforwardness he was held in great regard by all his colleagues of the Town Council, by whom his death is lamented.

NOTE—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

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